AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1 -18. (Canceled)

19. (Previously Presented) An apparatus for preparing an implantation space in the human spine to receive an insert between adjacent vertebral bodies, comprising:

a handle;

a shaft operably connected to said handle,

a drive mechanism adapted to be operably connected to a power source; and

an abrading element operably coupled to a distal end of said shaft for movement by said drive mechanism, said abrading element being moved in a direction different than which said shaft is moved, said abrading element having at least one abrading surface selected to create a predetermined surface contour of the adjacent vertebral bodies as said abrading element is moved by said drive mechanism.

20. (Previously Presented) The apparatus of claim 19, wherein said abrading surface includes teeth formed thereon to cooperatively engage said drive mechanism, said drive mechanism and said teeth being configured such that said abrading surface is rotated by said drive mechanism.

21. (Previously Presented) The apparatus of claim 19, further comprising a second abrading surface.

22. (Previously Presented) The apparatus of claim 21, wherein said abrading surfaces are rotated in opposite directions by said drive mechanism.

23. (Previously Presented) The apparatus of claim 21, wherein said abrading element has at least a top abrading surface and a bottom abrading surface.

24. (Previously Presented) The apparatus of claim 21, wherein said abrading surfaces are outwardly facing, and said abrading surfaces are inclined relative to one another.

25. (Previously Presented) The apparatus of claim 19, wherein said abrading element includes at least two abrading surfaces for simultaneously creating predetermined surface contours on the respective end plates of the adjacent vertebral bodies.

26. (Previously Presented) The apparatus of claim 19, wherein said abrading element includes a non-abrading surface formed on a side of said abrading element opposite said abrading surface, said non-abrading surface being configured to allow a surgeon to increase the pressure of said abrading surface against one of the adjacent vertebral bodies.

27. (Previously Presented) The apparatus of claim 19, wherein said abrading surfaces is convex.

28. (Previously Presented) The apparatus of claim 19, wherein said abrading element has a front surface and is tapered outwardly from said front surface toward said handle.

29. (Previously Presented) The apparatus of claim 19, wherein said abrading element includes a leading edge configured as a bone cutting surface.

30. (Previously Presented) The apparatus of claim 19, wherein said abrading surface

has a width, said width being adapted to substantially match the width of the nucleus pulposus of a disc space, in which it is inserted.

31. (Previously Presented) The apparatus of claim 19, wherein said abrading surface is substantially planar.

32. (Previously Presented) The apparatus of claim 19, wherein said abrading surface is configured such that it is generally parallel to said surface contour formed in the vertebral body as said abrading element is moved by said drive mechanism.

33. (Previously Presented) The apparatus of claim 19, wherein said abrading element is detachable from said shaft.

34. (Previously Presented) The apparatus of claim 19, wherein said abrading element is fixedly connected to said shaft.

35. (Previously Presented) The apparatus of claim 19 further comprising a mechanism that couples said abrading element to said drive mechanism.

36. (Previously Presented) The apparatus of claim 19, wherein said drive mechanism is disposed at least in part in said handle.

37. (Previously Presented) The apparatus of claim 19, wherein said power source is disposed at least in part in said handle.

38. (Previously Presented) The apparatus of claim 19, wherein said abrading element is driven in a reciprocating, arcuate motion by said drive mechanism.

39. (Previously Presented) The apparatus of claim 19, wherein said abrading element includes a wheel having cutter teeth along its perimeter.

40. (Previously Presented) The apparatus of claim 19, wherein said drive mechanism is adapted to produce a rotary movement of said abrading element about an axis generally perpendicular to a longitudinal axis of said shaft and about a general plane of a vertebral end plate of at least one of the adjacent vertebral bodies.

41. (Previously Presented) The apparatus of claim 19, wherein said drive mechanism is adapted to produce one of an oscillating rotation and a vibratory motion of the abrading element.

42. (Previously Presented) The apparatus of claim 19, wherein said drive mechanism is adapted to produce an oscillating rotation of the abrading element, wherein said oscillating rotation is from 20° to 45° to either side of the longitudinal axis of said shaft.

43. (Previously Presented) The apparatus of claim 19, wherein said drive mechanism comprises a gas-driven turbine powered by a source of compressed gas.

44. (Previously Presented) The apparatus of claim 19, wherein said drive mechanism is operable to move said abrading element in at least two degrees of freedom.

45. (Previously Presented) The apparatus of claim 19, further comprising a suction mechanism for removing bits of debris created by said abrading surface of said abrading element.

46. (Previously Presented) The apparatus of claim 19, further comprising an irrigation channel configured through said shaft for delivering irrigation fluid to the surgical site.

47. (Previously Presented) The apparatus of claim 19, further comprising at least one stop member adapted to limit the depth of travel of said abrading element into the spine.

48. (Previously Presented) The apparatus of claim 19, further comprising an insert adapted to be sized and shaped to match the space formed in the spine by said abrading element.

49. (Newly Added) Apparatus for preparing a space in the human spine to receive an insert between adjacent vertebral bodies, comprising:

a handle;

a shaft operably connected to said handle;

a mounting member disposed at a distal end of said shaft;

a drive mechanism;

a power source operably connected to said drive mechanism; and

an abrading element mounted on said mounting member for movement by said drive mechanism, said abrading element having at least one abrading surface selected to create a predetermined surface contour in one of the adjacent vertebral bodies as said abrading element is moved by said drive mechanism.

50. (Newly Added) The apparatus of claim 49 wherein said abrading element includes outwardly facing first and second abrading surfaces, and said first and second abrading surfaces are inclined related to one another.

51. (Newly Added) The apparatus of any one of the preceding claims wherein said abrading element is detachable from said mounting element.

52. (Newly Added) The apparatus of any one of the preceding claims wherein said drive mechanism is adapted to produce one of an oscillating rotation and a vibratory motion of the abrading element.

53. (Newly Added) The apparatus of any one of the preceding claims, wherein said drive mechanism is operable to move said abrading element in at least two degrees of freedom.

53. (Newly Added) The apparatus of any one of the preceding claims, including a suction mechanism for removing bits of debris created by said abrading surface of said abrading element.

54. (Newly Added) The apparatus of any one of the preceding claims, including an irrigation channel configured through said shaft for delivering irrigation fluid to the surgical site.

55. (Newly Added) The apparatus of any one of the preceding claims, including at least one stop member to limit the depth of travel of said abrading element into the spine.

56. (Newly Added) The apparatus of any one of the preceding claims, further comprising: a guide having an opening for providing protected access to the disc space and the adjacent vertebral bodies, said opening being configured for passage of said abrading element through said guide; and first and second disc penetrating extensions extending from said guide for insertion into the disc space between the adjacent vertebral bodies, each of said disc penetrating extensions having a portion for bearing against each of the adjacent endplates of the adjacent vertebral bodies, each of said portions of said disc penetrating extensions having an upper surface adapted to contact one of the adjacent endplates of the adjacent vertebral bodies

and a lower surface adapted to contact the other of the adjacent endplates of the adjacent vertebral bodies, said portions of said disc penetrating extensions having a height between said upper and lower surfaces and a length sufficient to properly align and distance apart the adjacent vertebral bodies.

57. (Newly Added) The apparatus of claim 56, wherein said upper and lower surfaces are parallel to each other along a substantial portion of the length thereof.

58. (Newly Added) The apparatus of claims 56 and 57, wherein said guide has an external surface at its distal end and said disc penetrating extensions are at least in part coextensive with said external surface.

59. (Newly Added) The apparatus of claims 56-58, wherein said disc penetrating extensions are diametrically opposed to each other and spaced apart from one another to provide access to the adjacent vertebral bodies from within the disc space.

60. (Newly Added) The apparatus of claims 56-59, wherein the height of said disc penetrating extensions have at least a portion that approximates the height of a normal disc space between the adjacent vertebral bodies.

61. (Newly Added) The apparatus of claims 56 and 58-60, wherein said disc penetrating extensions have a tapered leading end to facilitate placement of said disc penetrating extensions into the disc space, said portion of said disc penetrating extensions having opposite surfaces for bearing against the endplates of the adjacent vertebral bodies, said opposite surfaces diverging away from said guide along at least a portion of their length.

62. (Newly Added) The apparatus of claims 56-60, wherein said upper and lower surfaces converge away from said guide along at least a portion of their length.

63. (Newly Added) The apparatus of claims 56 and 58-60, wherein said guide conforms at least in part to the exterior surface of the adjacent vertebral bodies.

64. (Newly Added) The apparatus of claims 56-63, further comprising means for penetrating the two adjacent vertebral bodies.

64. (Newly Added) The apparatus of claims 56-64, said disc penetrating extension having a length greater than one-half the depth of the disc space measured from the anterior aspect to the posterior aspect of the disc space.

65. (Newly Added) The apparatus of claims 56-65, wherein said guide has an interior having a cooperating surface for guiding a corresponding cooperating surface on said mounting member.

66. (Newly Added) The apparatus of any of the preceding claims, further comprising an insert sized and shaped to match the space formed in the spine by said abrading element.

67. (Newly Added) An abrading element for preparing a space between adjacent vertebral bodies to receive an insert, said abrading element having at least one abrading surface and being mountable on a apparatus capable of moving said abrading element to cause said abrading surface to create at least one surface having a predetermined contour in the end plate of at least one of said adjacent vertebral bodies, said abrading surface having a width selected to

substantially match the overall width of the insert to be received between the adjacent vertebral bodies.

68. (Newly Added) The abrading element of claim 67, wherein said abrading element has a top surface and bottom surface.

69. (Newly Added) The abrading element of claims 67 and 68, wherein at least one of said top and bottom surfaces of said abrading element are roughened to provide said abrading surface.

70. (Newly Added) The abrading element of claims 67-69, wherein said abrading element has a leading edge configured to cut into at least one vertebral body as the abrading element is inserted into the spine.

71. (Newly Added) The abrading element of claims 67-70, wherein said abrading element is convex.

72. (Newly Added) The abrading element of claims 67-71, wherein said abrading element is tapered outwardly from said front surface of said abrading element.

73. (Newly Added) The abrading element of claims 67-72, wherein said abrading surface is configured and oriented such that it is generally parallel to the surface formed in the end plate of said vertebral body when in use.

74. (Newly Added) A method for performing surgery on a spinal segment including a disc space and two vertebral bodies adjacent the disc space of a human spine, said method comprising the steps of:

forming a socket by removing bone from at least a portion of at least one of the adjacent vertebral bodies from within the disc space and between the external perimeters of the two adjacent vertebral bodies, the socket having an entrance and an abutment wall opposite the entrance, the abutment wall having a height and a width, the abutment wall being in the shape of approximately one half of a circle from side to side along at least a portion of the width of the abutment wall; and

inserting a spinal insert into the socket, the spinal insert having a leading end and a trailing end opposite the leading end, the leading end of the insert having an exterior configured to substantially correspond to the shape of the abutment wall of the socket.

75. (Newly Added) The method of claim 74, wherein the step of forming includes removing bone from at least a portion of each of the adjacent vertebral bodies.

76. (Newly Added) The method of claim 75, wherein the step of forming includes forming the socket to have upper and lower surfaces that are angled relative to one another.

77. (Newly Added) The method of claim 76, wherein the step of forming includes forming the socket to have upper and lower surfaces that are generally parallel relative to one another.

78. (Newly Added) The method of claim 74, wherein the step of forming includes forming the socket to have at least one of an upper surface and a lower surface that is at least in part concave.

79. (Newly Added) The method of claim 74, wherein the step of forming includes forming the socket to have at least one of an upper surface and a lower surface that is at least in part planar.

80. (Newly Added) The method of claim 74, wherein the step of forming includes forming the socket to have a distance between entrance and the abutment wall that is greater than one-half the width of the abutment wall.

81. (Newly Added) The method of claim 74, wherein the step of forming includes forming the socket to have a distance between the entrance and the abutment wall that is greater than the width of the abutment wall.

82. (Newly Added) The method of claim 74, wherein the spinal insert is an artificial disc.

83. (Newly Added) The method of claim 74, wherein the spinal insert is a motion preserving device.

84. (Newly Added) The method of claim 74, wherein the spinal insert is a bone graft.

85. (Newly Added) The method of claim 74, wherein the spinal insert is a fusion implant.

86. (Newly Added) The method of claim 74, further comprising the step of combining the spinal insert with a fusion promoting material.

87. (Newly Added) The method of claim 74, wherein the spinal insert includes a hollow portion and the step of combing includes packing the spinal insert with the fusion promoting material.

88. (Newly Added) The method of claim 74, wherein the fusion promoting material is bone.

89. (Newly Added) The method of claim 74, further comprising the step of suctioning debris from the socket.

90. (Newly Added) The method of claim 74 further comprising the step of irrigating the socket.

91. (Newly Added) The method of claim 74, wherein the step of forming includes removing bone with a device that is mechanically driven.

92. (Newly Added) The method of claim 74, wherein the device includes an abrading element.

93. (Newly Added) A method for performing surgery on a spinal segment including a disc space and two vertebral bodies adjacent the disc space of a human spine, said method comprising the steps of: forming a socket by removing bone from at least a portion of at least one of the adjacent vertebral bodies from within the disc space and between the external perimeters of the two adjacent vertebral bodies, the socket having an entrance, an abutment wall opposite the entrance, and opposed side walls between the entrance and abutment wall, at least one of the side walls being at least in part straight, the abutment wall having a height and a width, the

abutment wall being in the shape of approximately one half of a circle from side to side along at least a portion of the width of the abutment wall; and inserting a spinal insert into the socket, the spinal insert having a leading end and a trailing end opposite the leading end, the leading end of the insert having an exterior configured to substantially correspond to the shape of the abutment wall of the socket.

94. (Newly Added) The method of claim 93, wherein the step of forming includes removing bone from at least a portion of each of the adjacent vertebral bodies.

95. (Newly Added) The method of claim 94, wherein the step of forming includes forming the socket to have upper and lower surfaces that are angled relative to one another.

96. (Newly Added) The method of claim 94, wherein the step of forming includes forming the socket to have upper and lower surfaces that are generally parallel relative to one another.

97. (Newly Added) The method of claim 93, wherein the step of forming includes forming the socket to have at least one of an upper surface and a lower surface that is at least in part concave.

98. (Newly Added) The method of claim 93, wherein the step of forming includes forming the socket to have at least one of an upper surface and a lower surface that is at least in part planar.

99. (Newly Added) The method of claim 93, wherein the step of forming includes forming the socket to have a distance between the entrance and the abutment wall that is greater than one-half the width of the abutment wall.

100. (Newly Added) The method of claim 93, wherein the step of forming includes forming the socket to have a distance between the entrance and the abutment wall that is greater than the width of the abutment wall.

101. (Newly Added) The method of claim 93, wherein the spinal insert is an artificial disc.

102. (Newly Added) The method of claim 93, wherein the spinal insert is a motion preserving device.

103. (Newly Added) The method of claim 93, wherein the spinal insert is a bone graft.

104. (Newly Added) The method of claim 93, wherein the spinal insert is a fusion implant.

105. (Newly Added) The method of claim 93, further comprising the step of combining the spinal insert with a fusion promoting material.

106. (Newly Added) The method of claim 105, wherein the spinal insert includes a hollow portion and the step of combining includes packing the spinal insert with the fusion promoting material.

107. (Newly Added) The method of claim 105, wherein the fusion promoting material is bone.

108. (Newly Added) The method of claim 93, further comprising the step of suctioning debris from the socket.

109. (Newly Added) The method of claim 93, further comprising the step of irrigating the socket.

110. (Newly Added) The method of claim 93, wherein the step of forming includes removing bone with a device that is mechanically driven.

111. (Newly Added) The method of claim 110, wherein the device includes an abrading element.

112. (Newly Added) A method for preparing an implantation space in the human spine to receive an insert between adjacent vertebral bodies, comprising:

affixing a milling jig to a patient's spine; and

forming concave surfaces of predetermined shape on the inferior and superior surfaces of opposing vertebral bodies.

113. (Newly Added) The method of claim 112 further comprising the step of distracting adjacent vertebrae prior to affixing the milling jig.

114. (Newly Added) A milling jig for preparing an implantation space in the human spine to receive an insert between adjacent vertebral bodies, comprising:

a first face for attaching to a patient's spine; and

a second face for receiving an abrading surface for forming concave surfaces of predetermined shape on the inferior and superior surfaces of opposing vertebral bodies.

115. (Newly Added) A method for performing surgery on a spinal segment, said method comprising the steps of:

forming concave surfaces of predetermined shape on the inferior and superior surfaces of opposing vertebral bodies; and

inserting concaval-convex structures that mate with the formed concave surfaces of predetermined shape.